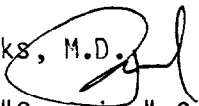


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*Office of the President*

November 30, 1987

To: Dr. Joshua Lederberg  
From: Paul A. Marks, M.D.   
Re: GM/Fortner "Overview" Cancer Research

I read your piece "carefully". Nevertheless, I have no substantial criticisms.

The issue of how we count cancer cells is fundamental as you point out. Our failure to be able to count cancer cells perhaps contributes to our relative ineffectiveness in treating close to 50% of all cancers.

The question you raise about how radiation or chemotherapy cures cancer is a very interesting one. I would take some exception. I think, the cytotoxic agents are selective but not tissue specific in target cell action. Tissue selectivity is more apparent in vivo than it is in vitro. The selectivity for tissues may involve metabolic phenomenon tissue environmental (location, blood, supply, and other factors rather than a characteristic of a given tissue phenotype.

The issue of why cancer patients are sick was one that I was interested in some time ago. Indeed, it was the first study I ever did related to cancer. Phenomenologically, it was easy to demonstrate that there were profound metabolic alterations associated with what clinically seemed to be relatively small, even minimal, tumors and that these metabolic changes were reversible upon removal of the tumor (see attached reprints). I have not followed this literature very carefully, but it is my impression that we do not have an explanation for these relatively long standing observations.

On the issues of prevention - I am not sure our highest priority need or should be environmental clean-up. The data suggests that smoking and diet may be quantitatively more important on a population basis as risk factors than environmental carcinogens.

In summary it is a very stimulating piece. Thank you for showing it to me.

Encl.

PAM/mam